

What is claimed is:

1           1. An apparatus for differentiating an item from a stack of items supported  
2 on a surface, said surface having a slot therein, extending at least across the base  
3 of said stack, said apparatus comprising:

4           a) a drive means including a shaft means adapted to be received in a guide  
5 means, said shaft means mounted under said surface, with respect to said stack and  
6 aligned with said slot;

7           b) a base member and a guide means, said guide means connected to said  
8 base member and adapted for receiving said shaft means, and carrying said base  
9 member along said shaft means;

10          c) a head member and a mounting means for mounting said head member  
11 on said base member, said mounting means providing for pivotal movement of said  
12 head member on said mounting means; and

13          d) a bias means coupled between said base member and said head member  
14 for urging said head member into an angular orientation with respect to said  
15 surface, said head member positioned on said base member for extending into said  
16 slot in said surface at least when said head member is in said angular orientation.

1           2. An apparatus for differentiating an item from a stack of items as in Claim  
2 1 where said guide means is a port means in said base member.

1           3. An apparatus for differentiating an item from a stack of items as in Claim  
2 wherein said drive means is a rotary motor and said shaft means is threaded on  
3 an outer surface and said port means is threaded and adapted to receive said shaft  
4 means.

1           4. An apparatus for differentiating an item from a stack of items as in Claim  
2 3 where in said drive means is a rotary motor and said shaft means is connected to  
3 said rotary motor for rotation on a major axis of said shaft means.

1           5. An apparatus for differentiating an item from a stack of items as in Claim  
2 2 wherein said drive means is a rotary motor and said shaft means is connected to  
3 said rotary motor for rotation and said shaft means is a threaded shaft, and said  
4 apparatus further includes a thread follower means coupled to said base member,  
5 and said thread follower means is adapted to ride in threads of said threaded shaft  
6 for urging said base member along said threaded shaft.

1                   6. An apparatus for differentiation an item from a stack of items as in Claim  
2                   2 and in which said drive means is a rotary motor and said shaft means is a  
3                   threaded shaft defined by a section of dual threads cut in an outer surface of said  
4                   threaded shaft and said section is defined by turn-around thread means at each end  
5                   of said section, and said threaded shaft is connected to said rotary motor for  
6                   rotating on a major axis of said threaded shaft and said base member further  
7                   includes a thread follower means coupled to said base and adapted for riding in  
8                   threads of said section of dual threads for urging said base member along said  
9                   threaded shaft.

1                   7. An apparatus for differentiating an item from a stack of items as in Claim  
2                   1 where in threads of said threaded shaft are dual threads defining a section on said  
3                   shaft with turn-around threads at each end of said section.

1                   8. An apparatus for differentiating an item from a stack of items as in Claim  
2                   1 wherein said drive means is a rotational drive means.

1                   9. An apparatus for differentiating an item from a stack of items as in Claim  
2                   7 wherein said drive means is an unidirectional drive means.

1           10. An apparatus for differentiating an item from a stack of items as in  
2 Claim 7 and further including thread follower means coupled to said base member  
3 and adapted to receive and ride in a thread of said dual threads of said threaded  
4 shaft means for moving said base member along said threaded shaft.

1           11. An apparatus for differentiating an item from a stack of items as in  
2 Claim 1 and in which said base member further includes an adjustable means  
3 between said base member and said head member for limiting the maximum extent  
4 of angular orientation to which said head member may be urged by said bias  
5 means.

1           12. An apparatus for differentiating an item from a stack of items as in  
2 Claim 11 and in which said adjustable means is a screw means threaded into a  
3 threaded hole in said base member.

1           13. An apparatus for differentiating an item from a stack of items as in  
2 Claim 11 wherein said head member is defined by a substantially straight body  
3 with a first end and a second end and said first end includes a facing means which  
4 is at an acute angle to said body and extends above said surface when said head  
5 member is urged into maximum angular orientation.

1           14. An apparatus for differentiating an item for a stack of items as in Claim  
2           11 wherein said head member is defined by an angular body with a first end and  
3           a second end and said first end includes a facing means which is substantially at  
4           normal to said angular body and said first end extends above said surface when  
5           said head member is urged into maximum angular orientation.

1           15. A differentiating system for a vending machine having a stack of items  
2           supported on a support surface with a slot in the support surface extending across  
3           said stack where a differentiator of said differentiating system separates items one  
4           at a time from said stack of items and delivers the separated item to a dispensing  
5           area of the vending machine, said differentiating system comprising:

6           a) a drive means and a threaded shaft member, said threaded shaft member  
7           connected to said drive means for rotating said threaded shaft member on a major  
8           axis, said threaded shaft member mounted under said support surface, with respect  
9           to said stack of items and in alignment with said slot in said support surface, said  
10          threaded shaft member adapted to be received in a port means;

11          b) a differentiator means defined by a base member, a head member, a  
12          mounting means, a bias means and a means for stabilizing said base member, said  
13          base member including a port means and a thread follower means, said port means  
14          adapted for receiving said threaded shaft member for mounting said differentiator  
15          means under said support surface and said thread follower means adapted for  
16          cooperating with threads of said threaded shaft for moving said differentiator

17 means along said threaded shaft means when said threaded shaft is rotated, said  
18 means for stabilizing said base for preventing rotation of said base member with  
19 said threaded shaft member, said mounting means for mounting said head member  
20 on said base member for rotational movement of said head member on said  
21 mounting means and said bias means connected between said base member and  
22 said head member for urging said head member to an angular orientation with  
23 respect to said support surface; and,

24 c) said threaded shaft member received in said port of said base member  
25 for positioning said head member mounted on said base member in said slot of said  
26 support surface so that a first end of said head member extends through said slot  
27 when said head member is urged into angular orientation by said bias means.

1 16. A differentiating system for a vending machine as in Claim 15 where  
2 in said base member further includes an adjustable stop means for limiting said  
3 angular orientation of said head member.

1 17. A differentiating system for a vending machine as in Claim 15 wherein  
2 threads of said threaded shaft member are defined by dual threads cut in a section  
3 of a surface of said threaded shaft and said section is defined by turn-around  
4 threads at each end of said section.

1                   18. A differentiating system for a vending machine as in Claim 17 wherein  
2                   said drive means is a unidirectional motor.

1                   19. A differentiating system for a vending machine as in Claim 15 wherein  
2                   threads of said threaded shaft are defined by a single thread extending substantially  
3                   along a length of said threaded shaft and said threaded follower is threads cut in  
4                   a surface of said port means.

1                   20. A differentiating system as in Claim 19 and in which said drive means  
2                   is a bidirectional, rotary drive means.

1           21. A differentiating system for a vending machine as in Claim 15 and  
2 further including a source of power connected to said reversible drive means  
3 through a three position switch means for driving said reversible drive means in  
4 said first rotational direction in a first position, driving said reversible drive means  
5 in said second rotational direction in a second position and for stopping said  
6 rotational drive means in a third position; and

7           an override switch means defined by a presence detector which is defined  
8 by an arm rotatably mounted under said support surface, with a protraction means  
9 coupled to one end of said arm and extending through a port in said support  
10 surface into a chamber holding said stack of items and a bias means for urging said  
11 protraction means into said chamber, and a contact means at a second end of said  
12 arm, said contact means having a closed position and an open position, said open  
13 position for preventing initiation of a new cycle of said differentiating system.